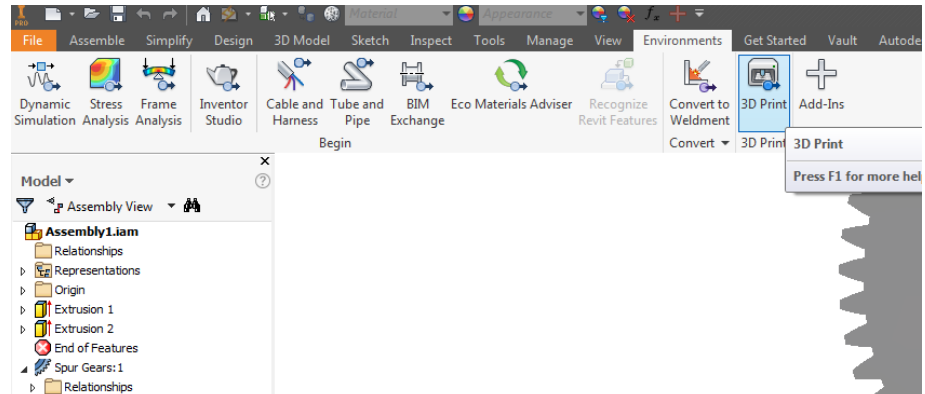


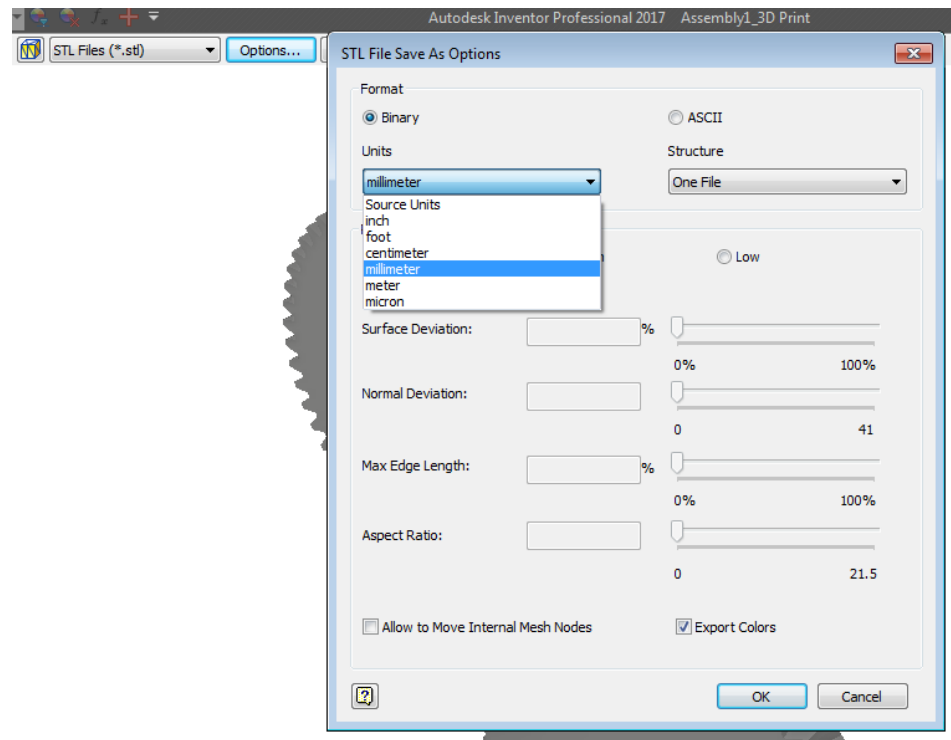
Readying Gears to be Printed

After designing your parts for printing, you should have them all in an assembly file (file extension: iam). You should have the following prepared before coming to the EPIC Lab, so you don't have to do it during the lab section, thus maximizing the amount of time you have to use for printing.

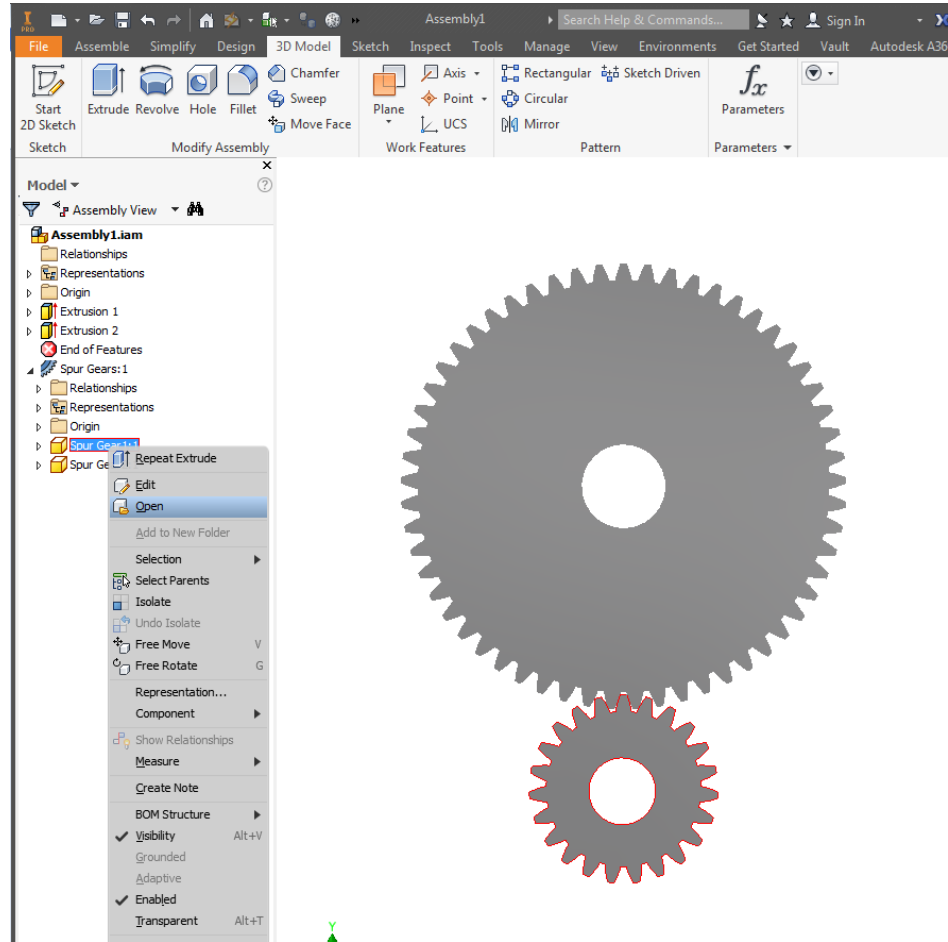
1. First, have your assembly open in Inventor. Go to *3D Print* under the *Environments* tab. This will open a new, temporary 3D print Window of the assembly.



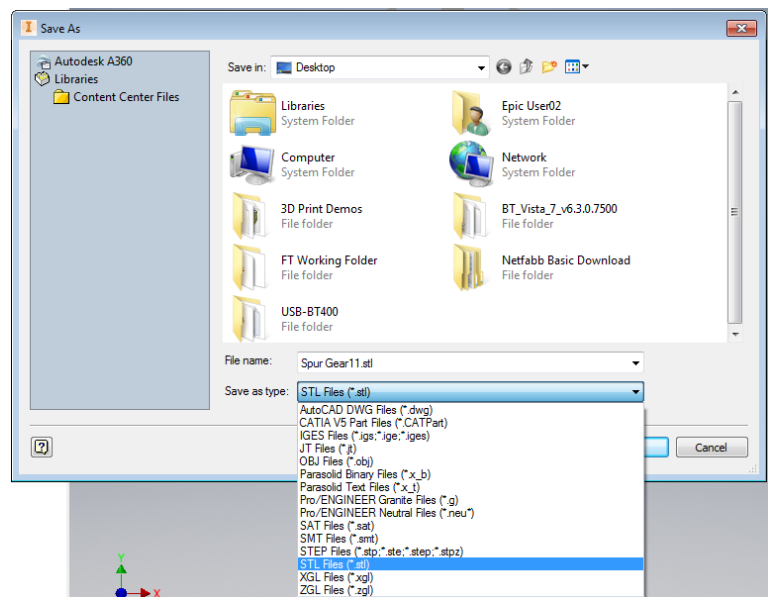
2. In the 3D print window, make sure STL is selected and hit *Options*. Set the units to millimeters. By default, Inventor will save exported models in centimeters. This will make your models 10 times too small when you try to print them, since the software will read the try to model in millimeters.



3. Close the 3D print window, and return to the assembly window. For each part, right click them in the menu and hit *Open*. This will open a temporary new part window of the model.

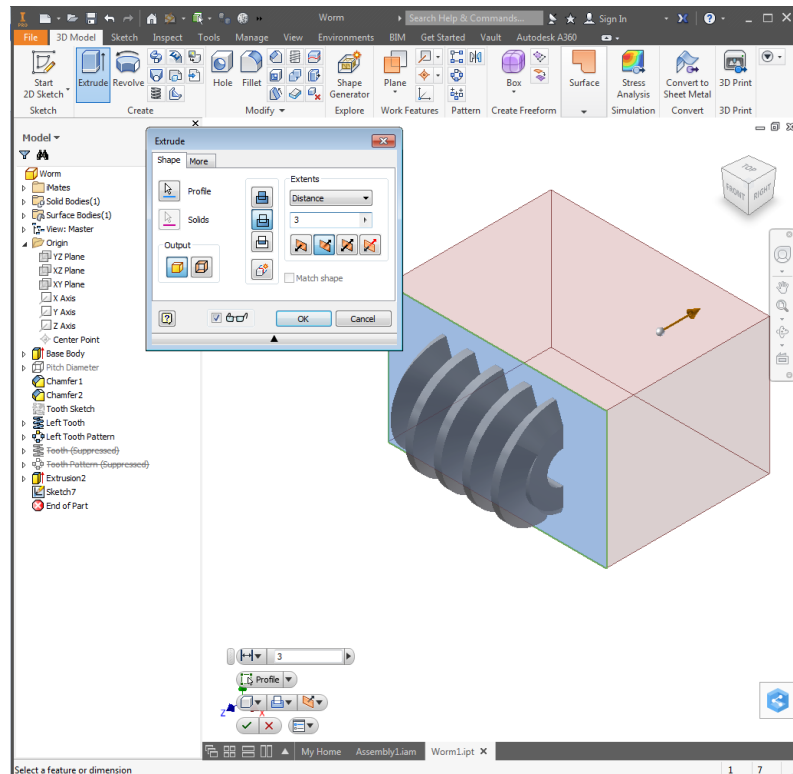


4. When you have a part in a separate file, go to *File->Export->Cad Format*. Click the drop down menu in the export window and select STL. After you export, you may close the part window and return to the assembly window. You will need to export all your parts to STL. It is recommended that you export each part separately instead of the whole assembly at once. Have your STL files ready for printing when you go to your 3D printing session.



Accommodating for Worms

Long, narrow worms will have trouble printing properly, as gravity will drop the plastic and make the bottom end thicker than the top. Split the worm in half for printing, and export each side to STL for printing.

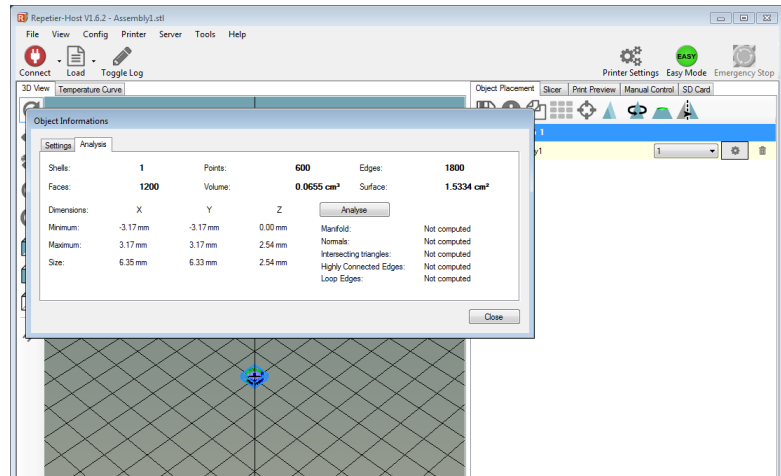


Scaling Gears Using Repetier

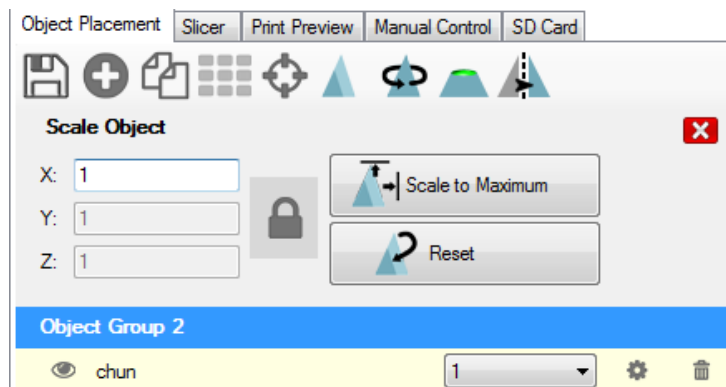
The program, Repetier will be used to convert 3D models into G-Code for the 3D printers. When you have your parts loaded into Repetier, here are the steps to scale and check if your parts are of the right size.

1. Load your parts into Repetier. Hit *File->Load* or shortcut 'ctrl+o' to load each STL part into the environment. The grey platform is the actual size of the bed of the printers we will be using. The diameter is 12cm.
2. To check the dimensions of an STL part, find the part under the *Object Placement* tab and click the gear next to the part. This will open an *Object Informations* window.

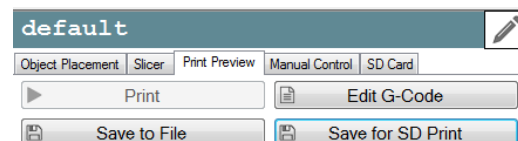
3. Go to the analysis tab in the *Object Informations* window. The dimensions of the part will be displayed under size, in the X, Y and Z axis.



4. To scale the part, use the scale tool by clicking the icon or with the shortcut, 's'. The number in the X, Y and Z fields are multipliers to the size in a single direction. If the Z of a part is 2mm, a multiplier of 1.5 will increase the height to 3mm. If dimensions are locked, all three dimensions of the part will be subject to a single multiplier. If you click on the lock to unlock, you can change the multiplier of each axis directly.



When your parts are all set, you may get them Sliced and printed. It is also recommended that you don't print more than 4 or 5 parts at a time, and try to keep the estimated print time to under one hour.



Printing Statistics

Estimated Printing Time:	16m:26s
Layer Count:	23
Total Lines:	15675
Filament needed:	1051 mm